

New Species and Comments on *Rhododendron* (Ericaceae) from the Island of Palawan, Philippines

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Abstract

Three new species of *Rhododendron* section *Vireya* are described: *R. mendumiae*; *R. reynosoi* and *R. wilkiei*, together with a new subspecies of *R. javanicum* ssp. *palawanense* and new records of *R. edanoi*, which is shown to be the same species as *R. pneumonanthum* of Borneo although differing at the sub-specific level. Keys are given to all the *Rhododendron* species currently known from the island of Palawan.

Introduction

The island of Palawan (Fig. 1) has high biodiversity (Anon., 1997). It has a distinctive Bornean element in its flora resulting from the fact that it is the only part of the Philippines lying on the Sunda Shelf (Whitmore, 1975) so that it has been connected with land bridges to the west in recent periods of low sea level. It has been, and still is, in many respects poorly investigated and Sleumer (1966) in his *Flora Malesiana* account of *Rhododendron* only reported three species specifically from the island, two endemics (*R. acrophilum* Merr. & Quisumb. and *R. edanoi* Merr. & Quisumb.) and one more widespread species (*R. javanicum* (Blume) Benn. var. *schadenbergii* (Warb.) Sleumer). Both endemics were known only from single collections at the time of his publication. Joint National Museum (Manila) and Royal Botanic Garden Edinburgh expeditions in 1992, 1997, 1998 and 1999 have added significantly to our knowledge of the flora of the island. *R. madulidii* Argent was described as a new endemic (Argent 1998) and *R. acrophilum* was rediscovered and the description amended after being introduced to cultivation and successfully flowered (Argent & Madulid, 1995). In this account, three new species are described from Cleopatra Needle and Thumb Peak (Fig. 1) together with new subspecies of *R. javanicum* (Blume) Benn. and *R. edanoi*. Of these subspecies, *R. javanicum* shows great similarity to the Mt. Kinabalu populations of this species and *R. edanoi* is shown to be insufficiently distinct from *R. pneumonanthum* Sleumer of Borneo to maintain this as a separate species. *Rhododendron bagobonum* H.F.Copel. was recorded from Mt Mantalingjahan in the south of the island (Argent RBGE Acc.No. 19922777). Originally described from the island of Mindanao in the Philippines, this record is an

extension of its known range in the Philippines and is yet another link to the Bornean flora where this species is widespread (Sleumer 1966, Argent 2003).

Vegetative Key to *Rhododendron* from Palawan

- 1 Largest leaves more than 5 cm wide,
petioles more than 2 cm long *javanicum*
Largest leaves up to 3 cm wide, petioles up to 1.5 cm long 2
- 2 Leaves less than 1 cm wide *bagobonum*
Leaves more than 1 cm wide 3
- 3 Stems minutely puberulent (and with scales),
leaves narrowly but distinctly revolute *madulidii*
Stems with scales only, leaf margin flat
(or only very indistinctly revolute in *R. mendumiae*) 4
- 4 Leaf apex rounded (except sometimes with a mucronate point) *edanoi*
Leaf apex obtusely or acutely pointed 5
- 5 Leaves mostly, or at least commonly, broadest in the upper half 6
Leaves broadest in the middle, only rarely broader in the upper half 7
- 6 Leaves in tight pseudowhorls spread over c. 6 mm of stem,
leaf blades up to 4 cm long *acrophilum*
Leaves in loose pseudowhorls spread over c. 20 mm of stem,
leaf blades often more than 5 cm long *mendumiae*
- 7 Largest leaf blades more than 5 cm long,
lateral veins more than 6 per side *reynosoi*
Largest leaf blades up to 4 cm long,
lateral veins 3 or 4 per side *wilkiei*

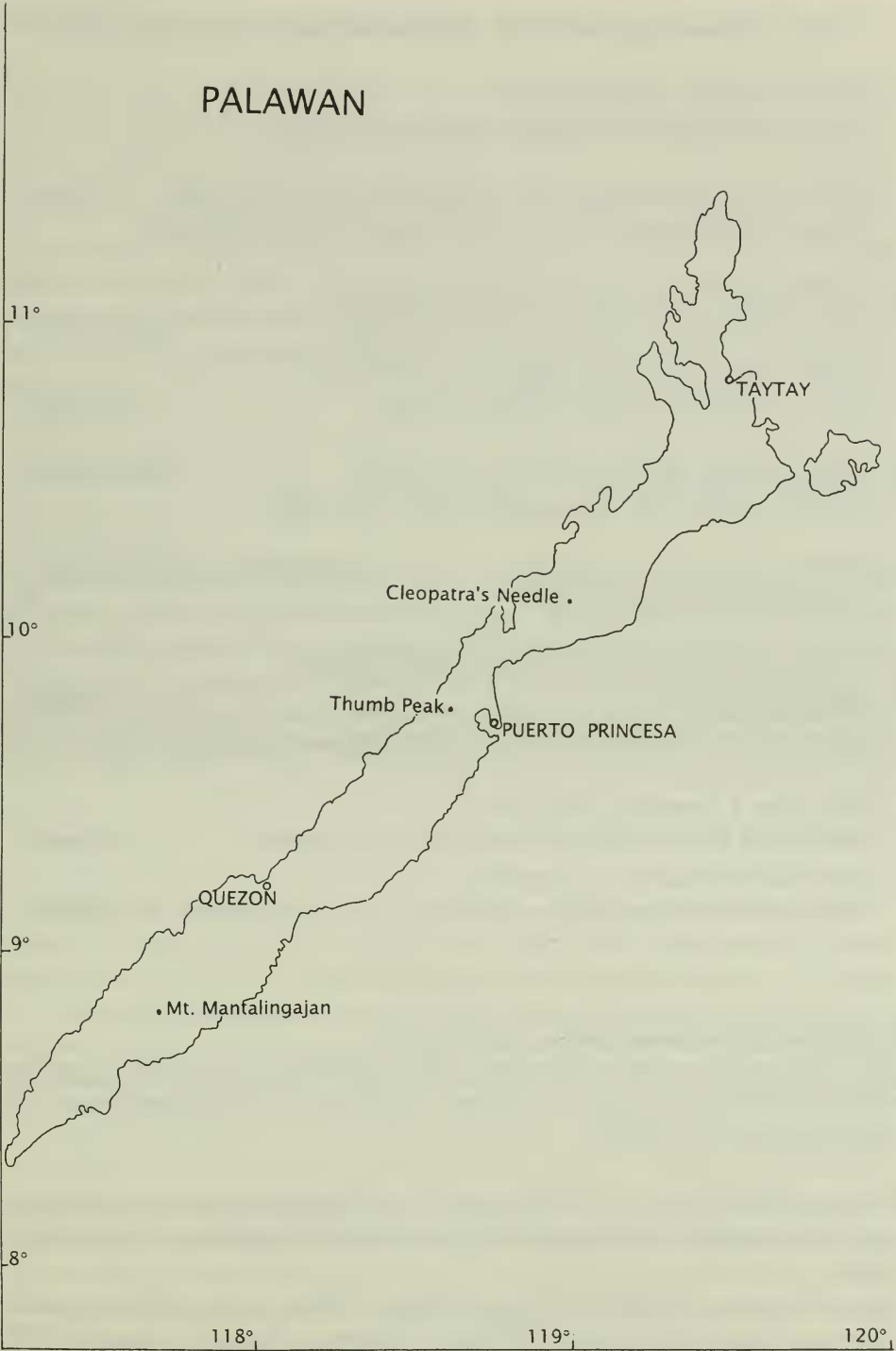


Figure 1. The island of Palawan, Philippines.

Key to flowering specimens of *Rhododendron* from Palawan

- 1 Flowers white or very pale pink 2
 Flowers coloured, red orange or yellow and orange 4
- 2 Flowers hypocrateraeform, the tube up to 6 mm in diameter *edanoi*
 Flowers funnel-shaped, the tube more than 15 mm in diameter 3
- 3 Flowers up to 3 per umbel, bract tips reflexed,
 stems and pedicels without a fine puberulence *mendumiae*
 Flowers more than 3 per umbel, bract tips erect,
 stems and pedicels with a fine puberulence *madulidii*
- 4 Flowers longer than broad, up to 1 cm wide *bagobonum*
 Flowers broader than long or more than 2 cm wide 5
- 5 Flowers more than 6 cm long *javanicum* ssp. *palawanense*
 Flowers less than 4 cm long 6
- 6 Filaments and inside of the corolla tube glabrous
 corolla lobes red *wilkiei*
 Filaments and inside of the corolla tube hairy, corolla lobes orange 7
- 7 More than 5 flowers in each umbel,
 the flowers bright orange with a red star in the throat *reynosoi*
 Less than 4 flowers in each umbel,
 the flower bicoloured with a yellow tube and orange lobes *acrophilum*

1. *Rhododendron mendumiae* Argent *sp. nov.*

Named in memory of Mary Mendum [1945–2004] who was on the expedition which collected this species. A tireless enthusiast for SE Asian botany and respected research worker.

R. madulidii simillima sed floribus majoribus fragrantibus per inflorescentiam uno duobus tantum, caulibus pedicellisque sine pilis simplicibus, et disco glabro differt.

Typus: Philippines, Palawan, Cleopatra Needle. 1600 m. *Argent, Chavez, Cronk, Fuentes, Mendum, Middleton & Wilkie* 53. Original collection 22 January 1998. Cultivated collection: 20 Sept. 2003. *Ac. No.* 19981815, (holo PNH; iso E).

Figure 2

Shrub to c. 1 m. *Stems* pale green, terete, c. 3 mm diam., moderately densely covered in brown stellate scales. *Leaves* in rather loose pseudowhorls 3–8 cm apart. *Petiole* 4–7 x 2–3 mm, faintly grooved above, pale green or pale pink with brown scales. *Leaf blade* narrowly oblanceolate, occasionally elliptic, 40–75 x 17–30 mm, at first scaly with silvery or brown scales above, quickly glabrescent, below brown scaly, the scales rounded to weakly lobed with darker centres which are often as broad in diameter as the flanges, distributed 1–2 diameters apart in the mature leaves. Leaf base cuneate, often slightly decurrent into the petiole; the margin entire, flat or slightly and narrowly recurved; the apex obtuse, with a somewhat obscure, white, non-protruding, gland-like structure at the point, midrib narrowly impressed above, distinctly prominent in the proximal half to two-thirds beneath, pink in colour especially towards the base, lateral veins plane, rather indistinct, 5–8 per side, the basal arising at an acute angle, the upper ones wide-spreading, all disappearing before the edge of the leaf.

Flower buds green, up to 40 x 22 mm, conical but contracted near the base, imbricate with the tips of the bracts reflexed. *Bracts* minutely hairy and with a few small, scattered scales outside and scales along the margins, inner ones often shortly emarginate. *Pedicels* 18–22 x 2–3 mm, green, laxly scaly but without simple hairs. *Flowers* one or two together, terminal, held more or less horizontally, white with a cream throat, very strongly and sweetly scented, 52–60 x 102–105 mm; *calyx* a lobed disk, densely scaly below, less so near the perimeter; *corolla tube* 26–30 x c. 15 x 17–24 mm, glabrous outside but with retrorse white hairs in the basal half inside, the lobes c. 46 x 35–46 mm, spreading more or less horizontally, overlapping to about half their length, with a rather irregular ‘frilled’ margin. *Stamens* clustered on the lower side of the flower, exserted 20–25 mm from the mouth, the filaments white, slightly dimorphic, 38–43 x 0.2 mm wide expanded suddenly for the basal 2.5 mm to c. 1.4 mm wide, glabrous but densely white hairy in the basal expanded portion, anthers brown, c. 7 mm long, shortly but distinctly apiculate at the base. *Disc* green with dense short. white, erect hairs. *Ovary* c. 6 x 5 mm, broadly trapezoid in outline, densely silvery scaly and with rather sparse short patent hairs mostly towards the top. Style cream, lying on the lower side of the corolla tube but curving upwards when the stigma becomes receptive, c. 50 mm, rather densely patent-hairy and sparsely scaly in the basal third, the scales arising on low papillae. Stigma white, 4–7 mm in diam., somewhat crown-shaped, exserted up to 15 mm beyond the anthers. *Fruit* 25 x 12 mm, pale green with a covering of dense brown scales, the pericarp only weakly separating from the valves which curve outwards on opening without twisting, the placentae separating from the central column. *Seeds* c. 2.3 mm long, without tails 1.0 mm, the longest tail 0.8 mm.

Notes: *Rhododendron mendumiae* is somewhat reminiscent of *R. madulidii* from Mt Mantalingajan near the southern tip of Palawan but that species has many more flowers in the inflorescence, puberulous stems and pedicels, and very different flower bud morphology with erect not reflexed tips to the bracts. Vegetatively, it looks very similar to *R. jasminiflorum* Hook. var. *copelandii* (Merr.) Sleumer, but the massive flowers of this new species are totally different to the slender flowers with very small lobes of that species and the bud morphology again is also very different.

This very distinctive species should be associated with Sleumer's (1966) subsection *Euvireya* on the basis of its short broad corolla tube relative to the enormous lobes and the well spaced, stellate scales on the leaves. It is slightly anomalous in that, from the single observation of fruit dehiscence, the pericarp remains closely attached to the valves, only weakly separating near the tips but it clearly does not belong in the groups with adherent pericarps from the scale morphology. On the basis of leaf size it could be placed in either series *Buxifolia* or series *Javanica*. In series *Buxifolia*, it clearly does not key out having a very distinct combination of characters. In series *Javanica*, it would key out with the Indonesian species: *R. lompohense* J.J.Sm., *R. bloemberginii* Sleumer, from Sulawesi or *R. buruense* J.J.Sm. from Maluku, all rather unlikely geographical alliances. All three of these species have many more flowers in the inflorescence, much smaller corolla lobes and ovaries that are much longer than broad. When this species flowered in cultivation for the first time in 2002 with a single flower, it was thought this must be an anomalous peloric form but the following year two-flowered inflorescences were produced on several plants and it was concluded that these large flowers are normal. The seeds are rather unusual in having such short tails, these are characteristic of vireyas which occur in open situations on mountain peaks. *R. retusum* (Blume) Benn., *R. adinophyllum* Merr. and *R. abietifolium* Sleumer have similar seeds with very reduced tails. Since this species was collected near the summit of Cleopatra Needle where the vegetation was dense, mossy forest, this is a surprising character. Plants have been raised from both seed and cuttings collected in the wild and from the isolation of the peak it seems virtually impossible that these are hybrids. Given the isolation of the habitat and the very restricted area of mossy forest on the mountain, the population of this species is very small and must be vulnerable to any kind of habitat disturbance.

Additional specimens: All from the type locality with the same collecting details as the type: 19981798; 19981800; and 20031269.

2. *Rhododendron reynosoi* Argent *sp. nov.*

Named in memory of Ernesto Reynoso who was a wonderful companion on several expeditions and made a considerable contribution to Philippine botany working for the National Museum, Manila.

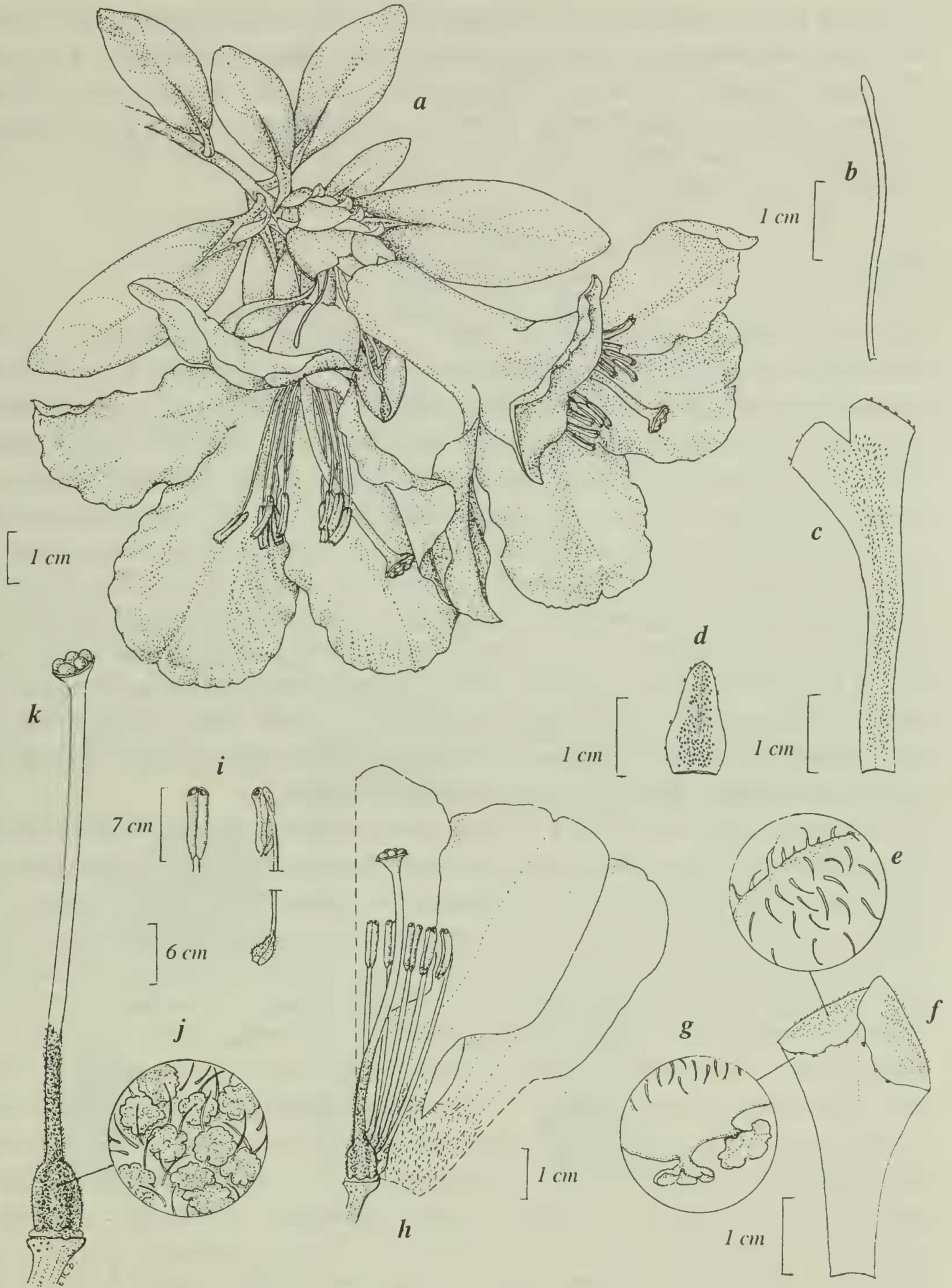


Figure 2. *Rhododendron mendumiae*

a Branch with inflorescence; *b* bracteole; *c*, *d*, *f* bracts; *e* enlargement of indumentum on abaxial surface of bract; *g* enlargement to show scales on bract margins; *h* part flower, opened; *i* anthers; *j* enlargement to show ovary indumentum; *k* pistil.

Umbella erecta florum clare aurantiacorum, foliis comparate parvis et foliis foliaceis bracteis sensim transientibus distincta. **Typus:** Philippines, Palawan, Cleopatra Needle, 22 January 1998, just below summit, moss forest, 1600m. *Argent, Chavez, Cronk, Fuentes, Mendum, Middleton & Wilkie 44A*. Original collection 22 Jan. 1998. Cultivated collection: 29 August 2002, Ac. No. 19981806 (holo PNH; iso E).

Figure 3

Shrub to c. 80 cm. *Stems* green, terete, c. 3 mm diam., moderately densely covered in brown stellate scales. *Leaves* in close pseudowhorls 1–2 cm apart, consisting mostly of 6–7 leaves. *Petiole* 6–10 x 1.5–2 mm, not grooved above, pale green with brown stellate scales. *Leaf blade* elliptic to slightly oblanceolate 50–80 x 15–30 mm, with some sparse silvery, sub-circular scales at first above but quickly glabrescent here, below moderately brown scaly, the scales rounded or weakly lobed slightly impressed, the centres small 1–3 diameters apart in the mature leaves. Leaf base broadly cuneate; the margin entire, flat, narrowly cartilaginous; the apex acute to broadly acute, sometimes shortly acuminate or apiculate, midrib narrowly impressed above although slightly prominent just above the petiole where it is also faintly grooved; beneath broadly raised for about three-quarters of the length proximally, lateral veins plane, 6–10 per side, spreading broadly but then curving upwards to link with the vein above before the margin, distinct above but obscure below.

Flower buds green, up to 40 x 20 mm, ovoid, sharply pointed with a gradual transition from foliage leaves to bracts these transitional forms having a smaller but distinct foliar blade with broad translucent decurrent margins instead of a petiole, the inner bracts narrowly lanceolate to subulate with spreading points. *Bracts* glabrous or with a few, scattered scales outside and along the margins but no simple hairs. *Pedicels* 9–15 x 1–2 mm, orange, moderately scaly but without simple hairs. *Flowers* terminal, 6–10 in an umbel, held erect or semi-erect, bright orange with a red star in the throat the points extended as lines along the lobes, without scent, 32–40 x 30–40 mm; *calyx* a low scaly disc. *Corolla tube* c. 15 x 6 x 13 mm, glabrous outside, white hairy in the proximal half inside, the lobes 15–30 x 12–22 mm, semi-erect, overlapping half to three quarters of their length, rounded or weakly emarginate at the apex. *Stamens* regularly arranged around the mouth of the flower, exserted to c. 5 mm, distinctly dimorphic, filaments pale orange, with white shaggy hairs in the basal third glabrous above, the anthers dark purple c. 3 x 1.5 mm. *Disc* green almost glabrous but with a few short hairs on the upper margin. *Ovary* c. 6.5 x 3 mm, ellipsoid, silvery-scaly and densely white hairy. Style orange, at first lying on the lower side of the corolla tube, rising to a central position as the flower ages, c. 14 x 0.8 mm, glabrous. Stigma purplish-red, hardly expanded from the style, c. 3 mm in diam. *Fruits* sub-cylindrical, tapering distally to the

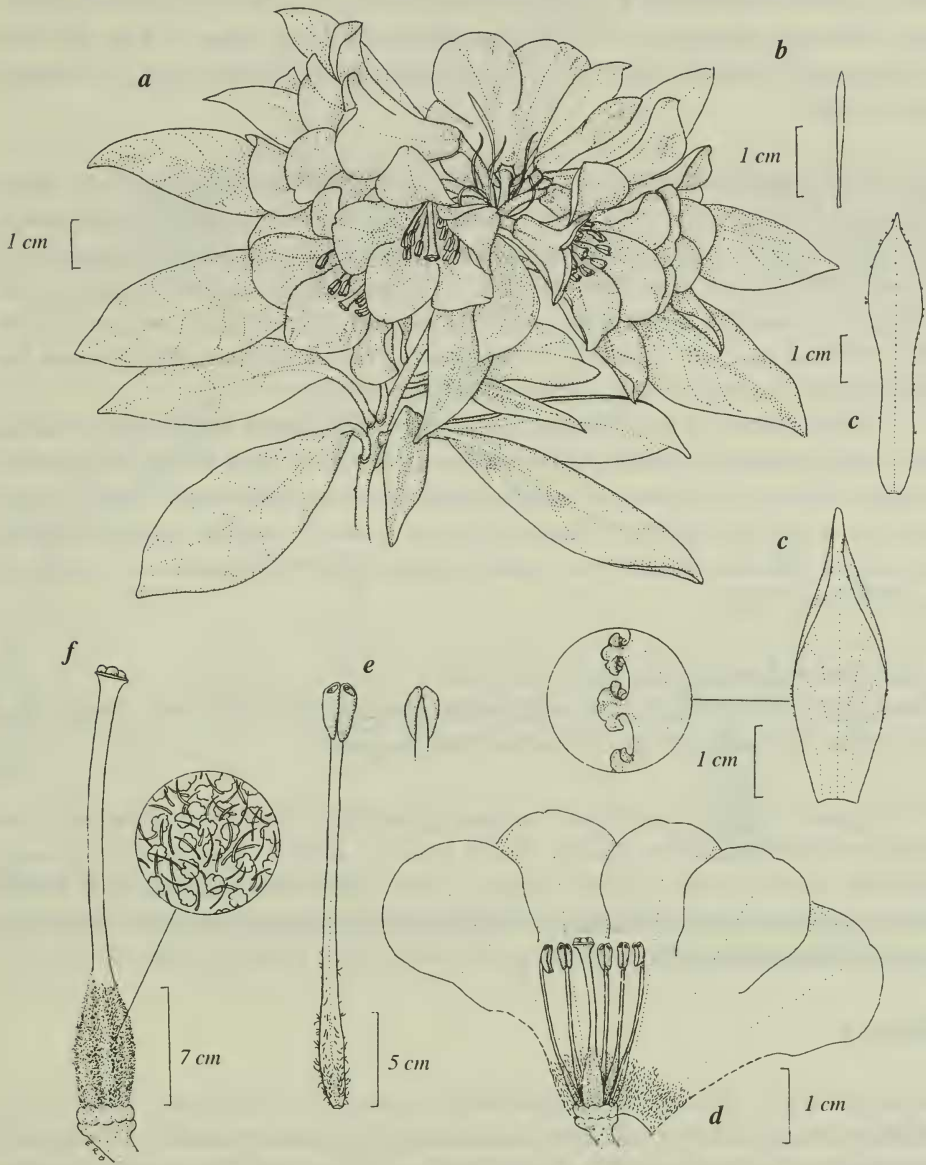


Figure 3. *Rhododendron reynosoi*
a branch with inflorescence; **b** bracteole; **c** bract with enlargement to show scales on the margin; **d** flower cut open; **e** stamen with anther back view; **f** pistil with enlargement of ovary indumentum.

style, grooved longitudinally in the proximal two thirds, 20–25 x c. 6 mm, the calyx slightly accrescent. On splitting the outer layer peeling back irregularly, the valves spreading to c. 45°, the placentae remaining more or less adherent to the central column. *Seeds* c. 3.7 mm long, with tails c. 0.8 mm, the longest tail 1.5 mm.

Notes: This species keys out in Sleumer (1966) to *Rhododendron leytense* Merr. differing, however, not only in the colour of the flowers, which is recorded as yellow in *R. leytense* but in the non-puberulous pedicels and it has more flowers in the inflorescence than that species. A unique feature, at least amongst the Philippine rhododendrons, is the gradual transition from foliage leaves to bracts, the intermediates are longer than the bracts, have broad sheathing bases but progressively smaller blades than the foliage leaves.

This species is very distinct with its bright vibrant orange flowers in a tight, erect umbel. This alone distinguishes it from all other Philippine species as those with several flowered umbels either have very differently sized flowers or have a totally different disposition. It is much smaller leaved than *R. javanicum* (Blume) Benn. var. *schadenbergii* (Warb.) Sleumer as conceived by Sleumer (1966).

3. *Rhododendron wilkiei* Argent *sp. nov.*

Named after Peter Wilkie, botanist and explorer in SE. Asia, who nearly died of a malarial attack helping to collect this species.

R. acrophilo similis a qua flore intense rubro haud bicolori et filamentis ac corollae parte interiore glabris (haud pilosis) differt. **Typus:** Philippines, Palawan, Thumb Peak. *Argent, Chavez, Cronk, Mendum, Middleton & Wilkie* 48. Original collection 30 January 1998; Cultivated collection *Ac.No.19981810* 11 July 2003. (holo PNH; iso E).

Figure 4

Weak shrub to c. 30 cm. *Stems* pale green, terete, c. 1.5 mm diam., moderately densely covered in brown stellate scales. *Leaves* in pseudowhorls 1–2 cm apart, consisting of 3–4 larger and 2–3 smaller leaves, mostly only possessing leaves at the terminal pseudowhorl. *Petiole* 2–3 x c. 1.5 mm, not distinctly grooved above but with a central line, pale green with brown stellate scales. *Leaf blade* elliptic 25–40 x 10–15 mm, with some sparse silvery, stellate scales at first but quickly glabrescent above, below moderately brown scaly, the scales rounded, lobed to sub-stellate, impressed into small pits the centres small and indistinct distributed 2–4 diameters apart in the mature leaves. Leaf base broadly cuneate; the margin entire, flat; the apex broadly acute to obtuse, sometimes with an

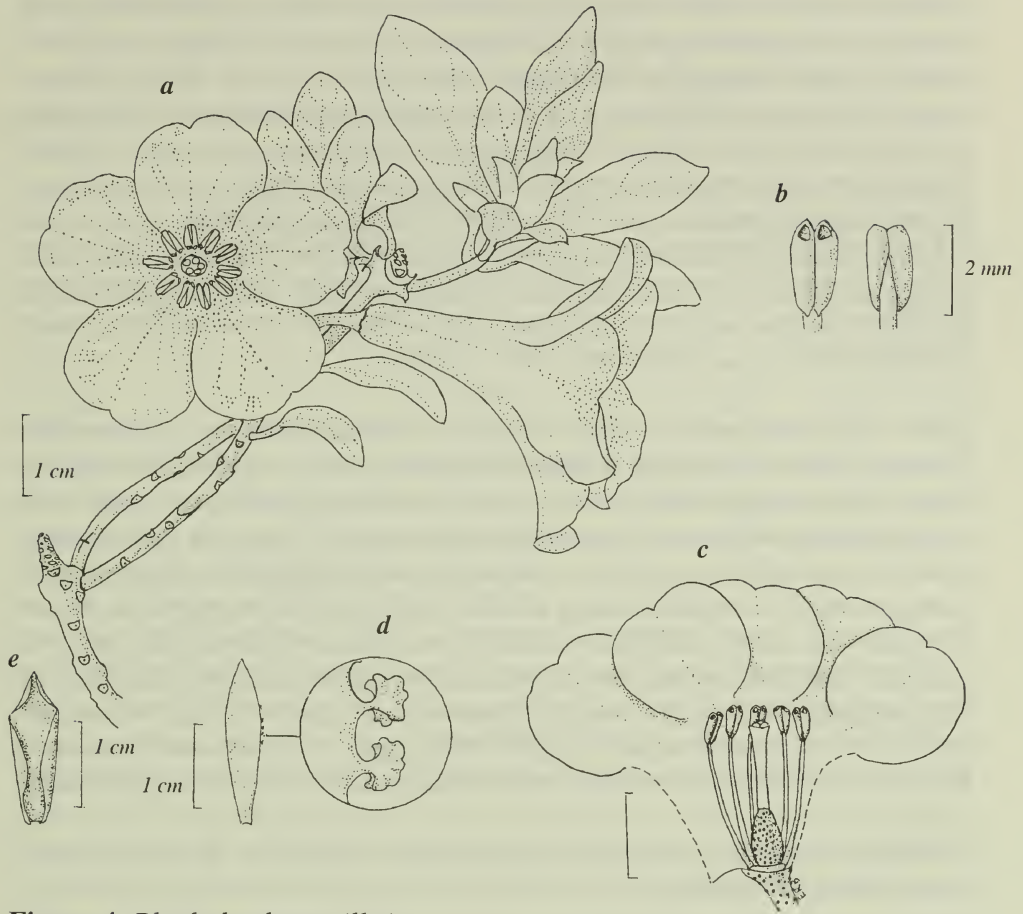


Figure 4. *Rhododendron wilkei*

a branch with inflorescence and opening bud; **b** anthers face and back view; **c** flower cut open; **d** inner bract with enlargement to show marginal scales; **e** bract.

obscure, white, non-protruding, gland-like structure at the point, midrib narrowly impressed above, slightly prominent just above the petiole but then somewhat impressed distally beneath, translucent green especially towards the base, lateral veins plane, 2–4 per side, spreading broadly but disappearing before the margin, distinct above but obscure below.

Flower buds green, up to 18 x 8 mm, narrowly conical but contracted near the base, sharply pointed with the basal bracts spreading, the upper (inner) bracts mostly appressed. *Bracts* glabrous or with a few small, scattered scales outside and with scales along the margins. *Pedicels* 10–15 x 1–2 mm, red, moderately

scaly but without simple hairs. *Flowers* terminal, solitary or paired, held half-hanging, red, without scent, *c.* 27 x 44 mm; *calyx* a low scaly disc or with two irregular longer lobes up to 2 mm long. *Corolla* tube *c.* 15 x 4 x 10 mm, glabrous outside and inside, the lobes *c.* 19 x 21 mm, spreading horizontally, overlapping to about half to two thirds of their length, emarginate at the apex. *Stamens* regularly arranged around the mouth of the flower, filaments pale pink, glabrous, the anthers dark purple 2–2.5 x *c.* 1.25 mm. *Disc* green glabrous. *Ovary* *c.* 6 x 2.5 mm, ellipsoid, rather sparsely brown-scaly, without simple hairs. Style pink, at first lying on the lower side of the corolla tube, rising to a central position as the flower ages, *c.* 20 mm, glabrous. Stigma purplish-red, hardly expanded from the style, *c.* 1.25 mm diam. *Fruits* not seen.

Notes: This keys out in Sleumer (1966) to *Rhododendron porphyranthes* Sleumer, known from only a single collection from the Arfak Mountains in New Guinea. Apart from being a most unlikely distribution pattern, *R. porphyranthes* differs in its rounded to emarginate leaves, in having much smaller corolla lobes, a smaller ovary and a style only half as long as in this new species. It is probably most similar to *R. acrophilum*, which is at least from the same island, but differs in the flower colour, which is bicoloured with a yellow tube and orange lobes in that species (Argent & Madulid, 1995) and that the filaments and the inside of the corolla are glabrous in *R. wilkiei*, not hairy. This new species also lacks the white waxy substance associated with the flower buds of *R. acrophilum* and is much less vigorous in its growth habit.

Additional specimen with the same collecting details as the type: 55, Ac.No.19981817 (PNH, E).

***Rhododendron javanicum* (Blume) Benn. ssp. *palawanense* Argent ssp. nov.**
Named from the island of Palawan from where it was collected.

Folia spiraliter disposita laevia. Gemmae anguste ovoideae apice acuto bracteisque adpressis. Flores *c.* 10 cm longi, aurantiaci fauce luteo, lobis circiter duplo longioribus quam latioribus. **Typus:** Philippines, Palawan, Mt. Mantalingajan. Argent & Romero Ac. 19922770 Cultivated specimen collected 16 January 1998. (holo PNH, iso E).

Shrub to 1.5 m. *Leaves* spirally arranged, smooth. *Flower buds* green, narrowly ovoid with an acute apex and appressed bracts. *Pedicels* glabrous or sparsely scaly. *Flowers* *c.* 10 x 9 cm, bicoloured, with a yellow tube, hairy inside near the base and forming a yellow 'star' in the mouth, lobes orange, *c.* 5 x 2.5 cm. *Stamens* with hairs in the basal quarter of the filaments, anthers *c.* 5 mm with grey pollen. *Ovary* glabrous, (in the type), or variably hairy and scaly.

Notes: Following Argent *et al.* (1988) and Argent (2003), *Rhododendron javanicum* is presently treated in a broad sense including *R. brookeanum* H.Low *ex* Lindl. and *R. moultonii* Ridl. This complex of mainly low altitude forest epiphytes is characterised by large, more or less elliptic, acutely pointed leaves and large funnel-shaped flowers in a range of colours. As conceived here, it is widespread occurring through Sumatra, Peninsular Malaysia, the Philippines, Borneo, Java, Bali to Sulawesi. It is highly variable in its leaf arrangement and ovary indumentum even within some populations and is difficult to deal with satisfactorily although various populations are distinct. This new subspecies is very similar to the Mt. Kinabalu populations: *R. javanicum* ssp. *brookeanum* (H.Low *ex* Lindl.) Argent & Phillips var. *kinabaluense* Argent, A.L.Lamb & Phillips, which is similarly a high altitude form with large, conspicuously bicoloured flowers, broad flower buds with appressed bracts that are often emarginate and rugose leaves arranged in regular spirals. The Palawan plants differ, however, in having smooth leaves, more slender flower buds with acutely pointed bracts and longer flowers, with longer and narrower lobes to the corolla, and grey pollen. The significance of pollen colour is not yet known but it was considered important as a specific character in *Aeschynanthus* (Gesneriaceae) by Mary Mendum (*pers. comm.*). Within the Philippines, all plants of *Rhododendron javanicum* were included in var. *schadenbergii* (Warb.) Sleumer (Sleumer, 1966). However, these recent collections from Mt. Mantalingajan are very different from the majority of Philippine collections, mostly from the island of Mindanao. These have much shorter, uniformly red flowers and cream pollen. The ovary indumentum in ssp. *palawanense* varies from completely glabrous to hairy and scaly in the proximal two thirds. Thus this Palawan population appears to be similar but not identical to the Kinabalu one and very different to at least that on Mindanao. It seems best to give these plants subspecies status at present which draws attention to their unique character and distribution. Further collections of this species complex from other islands in the Philippines are badly needed to satisfactorily understand the variation.

Additional collections that are very similar are from Cleopatra Needle, Ac. No. 19981796, and from Thumb Peak, Ac. Nos. 19981802, 19981812. A vegetative herbarium specimen in PNH from Victoria Peak is probably the same taxon.

New Records of *Rhododendron edanoi* Merr. & Quisumb.

Philippines, Palawan, Thumb Peak, near summit c.1200 m Argent, Chavez, Cronk, Mendum, Middleton & Wilkie 46, Ac. 19981808 Original collection 30 Jan.1998; Philippines, Palawan, Cleopatra Needle, just below summit c.1500 m, in mossy forest Argent *et al.* Ac.19981819. Original collection 15 January 1998. (All preserved in PNH. and E).

Notes: This species was previously only known from the type collection made on Mt. Mantalingajan near the southern tip of the island of Palawan on 13th May 1947 by G.E. Edaño. The materials collected in 1998 on the tiny isolated area of mossy forest on the summit of Cleopatra Needle and from Thumb Peak, a similar isolated area of mossy forest a little further to the south, were both seed and cuttings of what was designated in the field as the 'round leafed' rhododendron. None of these rhododendrons was in flower at the time of collection and identification had to await flowering in cultivation. This occurred first for the cutting material in March 2000 and for the seed in 2003. The interest in these collections is not just that this extends the range of this otherwise point endemic to most of the length of the island of Palawan but that it shows this species to be conspecific with that of *Rhododendron pneumonanthum* Sleumer of Borneo. Sleumer (1966) distinguished these two species at couplet '31' on the characters "Corolla tube more or less manifestly and gradually narrowed from the base upwards. Leaves sub-sessile (*R. pneumonanthum*) vs. Corolla tube equally wide all over or slightly and gradually widened from the base upwards. Leaves distinctly petioled. (*R. edanoi*).

From examination of isotypes of the original collection of *Rhododendron edanoi* from BM, K and L, the first character is not a valid difference. Several corolla tubes show a quite definite narrowing from the proximal to the distal ends. The corollas from cultivated plants from both Palawan and Borneo, in the fresh state all quite clearly taper from base to mouth. After pressing, the tube can appear to at least look parallel-sided. There does appear to be a difference in petiole length between Bornean and Philippine materials but again there is a lot of variation even on one plant and this alone would not support maintaining these plants as different species. There is a very small difference in the scales on the leaves from the two islands, those from Bornean materials are darker and more variable in size but both have essentially the same sub-stellate shape, are rather tall and set on pronounced epidermal tubercles. The vegetative habit of the plants in cultivation from the different islands is certainly very different. Both Philippine collections are slow and low growing compared to the tall 'leggy' and much more vigorous Bornean plants. It is tempting to imply that the Philippine plants growing in such small isolated populations are suffering from inbreeding depression compared with the much larger populations of *R. pneumonanthum* in northern Sarawak where it is reported to be common over large areas close to Bario on the slopes of Mt. Murud (A. Lamb *pers. comm.*). Differences in habit between different populations of the same species are known elsewhere in section *Vireya*. *R. burtii* P.Woods varies on different mountain ranges (Argent *et al.*, 1988) and *R. leptanthum* F.Muell. (*pers. obs.*). The clinching factor in regarding the Bornean *R. pneumonanthum* to be, at best, a subspecies and not specifically distinct from *R. edanoi* is the fact that the flower bud morphology is identical and very distinctive from both

island populations. The flower buds are broadly oval with reflexed points to the tips of the bracts (perulae of Sleumer, 1966).

Thus the Bornean populations are reduced to the status of subspecies which reflects the relationship between Philippine and Bornean plants more accurately:

R. edanoi* ssp. *pneumonantherum (Sleumer) Argent **comb. nov.**

Basionym: *R. pneumonantherum* Sleumer, Reinwardtia 5 (1960) 132.

Key to the subspecies

Small spreading plants, mostly less than 30 cm,
petioles mostly more than 5 mm long,
distinctly longer than wide, scales pale brown ssp. *edanoi*

Tall erect plants, often more than 1 m, petioles up to
3 mm long, hardly longer than wide, scales
blackish-brown when mature ssp. *pneumonantherum*

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